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EXAMINER	
STEVENS, THOMAS H	

ART UNIT	PAPER NUMBER
2121	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/838,801	BERK ET AL.	
	Examiner	Art Unit	
	Thomas H. Stevens	2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 September 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17,19-31 and 33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17,19-31,33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-17,19-31,33 were examined.

Section I: Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 09/17/2007 has been entered.

Section II: Non-Final Rejection

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 1-17,19-31 and 33 are directed to computing atomic molecular level species spectral transmittances. This claimed subject matter lacks a practical application of a judicial exception (law of nature, abstract idea, naturally occurring article/phenomenon) since it fails to produce a useful, concrete and tangible result.

Specifically, the claimed subject matter does not produce a **useful result** because the claimed subject matter fails to sufficiently reflect at least one practical utility set forth in the descriptive portion of the specification. More specifically, while

the described practical utility is directed to computing atomic molecular level species spectral transmittances, the claimed subject matter relates ONLY to calculating transmittance values which is nothing more than to manipulate data.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-17,19-31 and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Abreu et al., (US Patent 5,315,513; hereafter Abreu). Abreu teaches a moderate resolution model and computer code used to predict atmospheric transmittance and background radiance in the microwave, infrared, visible and near ultraviolet spectral regions (abstract).

Claim 1. A band model (abstract, line 17) method for determining individual atomic and molecular species spectral transmittances (abstract, lines 2 and 4) through a gaseous medium (examples, column 18, lines 51-53), the method comprising the steps of: providing atomic and molecular transition data (column 4, lines 1-14) for a given spectral range and atmospheric conditions ("atmospheric transmittance", column 3, lines 23-27, lines 13-34 especially); selecting a spectral region to be considered; dividing the spectral region into a number of spectral bins (columns 4 and 5, lines 59-68,1-5, respectively discuss the 1 cm spectral bins, the atmospheric molecules at their

various temperatures) that determine a spectral resolution (column 3, lines 1-11, "spectral regions"), each band model (abstract, line 17) having a width of; calculating atomic and molecular species line center (column 14, lines19-21) absorption from at least an equivalent width (column 15, lines 1-25, especially lines 1-3) of the atomic and molecular transitions (suggestion of molecular activity, "molecular profiles", column 4, line 10)centered within each spectral bin (column 4, lines 59-68); calculating line tail (column 14, lines 5-17, especially line 18)absorption (column 13, line 3) within each a spectral bin bins (columns 4 and 5, lines 59-68,1-5, respectively discuss the 1 cm spectral bins, the atmospheric molecules at their various temperatures) from atomic and molecular transitions (suggestion of molecular activity, "molecular profiles", column 4, line 10)not centered within the bin; determining atomic and molecular species spectral transmittances (abstract, lines 2 and 4)for each spectral bin(column 4, lines 59-68), the spectral transmittances (abstract, lines 2 and 4)having a value which is a function of at least the calculated line center (column 14, lines19-21)absorptions and the calculated line tail (column 14, lines 5-17, especially line 18)absorptions (column 13, line 3); and using the determined spectral transmittances (abstract, lines 2 and 4) in analysis of atmospheric optical (mention of Optical beams, column 4, line 17) sensor (block diagram of sensor system, column 3, line 3) data.

Claim 2. The method of claim 1, wherein the spectral bins (column 4, lines 59-68) have a width of about 0.1 cm^{-1}.

Claim 3. The method of claim 1 wherein the calculating line center (column 14, lines19-21)absorption step includes calculating, from an exact expansion, a bin Voigt (column 14, lines 63-66)equivalent width (column 15, lines 1-25, especially lines 1-3) of atomic and molecular transitions (suggestion of molecular activity, "molecular profiles", column 4, line 10)whose centers lie within the spectral bin (column 4, lines 59-68).

Claim 4. The method of claim 3, wherein the exact expansion is an exact modified Bessel functions (well known mathematical functions)expansion.

Claim 5. The method of claim 3, wherein the calculating line tail absorption (column 13, line 3) step includes subtracting line- tail absorption (column 13, line 3) as calculated from a column strength, a Lorentz (column 14, lines 12-14) half-width (column 14, lines 5-17, especially line 14), a Doppler (column 14, lines 63-67) half-width (column 14, lines 5-17, especially line 14), and a line tail (column 14, lines 5-17, especially line 18)spectral displacement (suggestion of tail contributions, columns 13, lines 20-24).

Claim 6. The method of claim 3, wherein the calculating line center (column 14, lines19-21) absorption step includes determining a Voigt (column 14, lines 63-66) line-shape function computed at specific frequencies (examples of spectrum charts, figures

6 and 7).

Claim 7. The method of claim 1, wherein the line tail (column 14, lines 5-17, especially line 18)calculation step includes calculating line tail absorption (column 13, line 3) within each bin (column 4, lines 59-68) from atomic and molecular transitions (suggestion of molecular activity, "molecular profiles", column 4, line 10)centered outside of the bin (column 4, lines 59-68) using Pade (well known mathematical functions) approximant spectral fits to Voigt (column 14, lines 63-66) absorption coefficient curves.

Claim 8. The method of claim 7, wherein the line tail absorption (column 13, line 3) calculation step includes determining a database of temperature (column 12, line 5) and pressure dependent Pade (well known mathematical functions) approximant spectral fits to Voigt (column 14, lines 63-66)absorption coefficient curves.

Claim 9. The method of claim 8, wherein there are five Pade (well known mathematical functions) parameters.

Claim 10. The method of claim 8, wherein Pade (well known mathematical functions) parameters are determined from summed line tail (column 14, lines 5-17, especially line 18)spectral absorption coefficients (column 12, line 52).

Claim 11. The method of claim 10, wherein each bin (column 4, lines 59-68) has a center and two edges, and one Pade (well known mathematical functions) parameter is determined at the center of the bin, and one at each edge of the bin (column 4, lines 59-68).

Claim 12. The method of claim 10, wherein one Pade (well known mathematical functions) parameter is the derivative of the absorption coefficient (column 12, line 52) with respect to a normalized spectral variable at the line center.

Claim 13. The method of claim 10, wherein one Pade (well known mathematical functions) parameter is the integral of the spectral absorption coefficient over a spectral band (e.g. spectrum chart, figure 2).

Claim 14. The method of claim 8, wherein the Pade (well known mathematical functions) database is generated for a plurality of temperatures (column 12, line 5) (column 2, line 10).

Claim 15. The method of claim 8, wherein the Pade (well known mathematical functions) database is determined for a plurality of pressures (suggestion or mention of

pressure in relation to the line center using the Lorentz equation, column 13, lines 49-55).

Claim 16. The method of claim 1, wherein the line center (column 14, lines19-21)absorptions are calculated from atomic and molecular transitions (suggestion of molecular activity, "molecular profiles", column 4, line 10)centered no more than half a spectral bin (column 4, lines 59-68) width from the bin, (column 4, lines 59-68) and the line tail absorption (column 13, line 3) are calculated from atomic and molecular transitions (suggestion of molecular activity, "molecular profiles", column 4, line 10)not centered within a half spectral bin from the bin.

Claim 17. A model method for computing (element 710 "computer") the contribution of line centers to a determination of individual atomic and molecular species spectral transmittances (abstract, lines 2 and 4) through a gaseous medium (examples, column 18, lines 51-53) the method comprising the steps of: providing atomic and molecular transition data (column 4, lines 1-14) for a given spectral range and atmospheric conditions ("atmospheric transmittance", column 3, lines 23-27, lines 13-34 especially); selecting a spectral region to be considered; dividing athe spectral region into a number of spectral bins (column 4, lines 59-68)that determine a spectral resolution (column 3, lines 1-11, "spectral regions"), each bin having a width of less than 1.0 cm^{-1} (mention of Optical beams, column 4, line 17) depth less than 1.0 cm -1, column 4, lines31-33); calculating a bin Voigt (column 14, lines 63-66)equivalent width (column 15, lines 1-25, especially lines 1-3) of atomic and molecular transitions (suggestion of molecular

activity, "molecular profiles", column 4, line 10)centered within each spectral bin (column 4, lines 59-68) from an exact expansion; determining atomic and molecular species spectral transmittances (abstract, lines 2 and 4)for each spectral bin, (column 4, lines 59-68) the spectral transmittance (abstract, lines 2 and 4)having a value which is a function of at least the calculated equivalent width (column 15, lines 1-25, especially lines 1-3) (e.g., spectral resolution width, column 4, lines 50-54): and using the determined spectral transmittances (abstract, lines 2 and 4)in analysis of atmospheric optical (mention of Optical beams, column 4, line 17) sensor (block diagram of sensor system, column 3, line 3) data.

Claim 19. The method of claim 17, wherein the spectral bins (column 4, lines 59-68)have a width of about 0.1 cm^{-1}.

Claim 20. The method of claim 17, wherein the exact expansion is an exact modified Bessel functions (well known mathematical functions)expansion.

Claim 21. The method of claim 17, wherein the calculating step includes subtracting line- tail absorption (column 13, line 3) as calculated from a column strength, a Lorentz (column 14, lines 12-14) half-width (column 14, lines 5-17, especially line 14), a Doppler (column 14, lines 63-67) half-width (column 14, lines 5-17, especially line 14), and a line tail (column 14, lines 5-17, especially line 18)spectral displacement (suggestion of tail contributions, columns 13, lines 20-24).

Claim 22. The method of claim 17, wherein the calculating step includes determining a Voigt (column 14, lines 63-66) line-shape function computed at specific spectral frequencies (examples of spectrum charts, figures 6 and 7).

Claim 23. A method for computing (element 710 "computer") the contribution of line tails to the determination of individual atomic and molecular species spectral transmittances (abstract, lines 2 and 4) through a gaseous medium (examples, column 18, lines 51-53) the method comprising the steps of: providing atomic and molecular transition data (column 4, lines 5-11)for a given spectral range and atmospheric conditions ("atmospheric transmittance", column 3, lines 23-27, lines 13-34 especially); selecting a spectral region to be considered; dividing athe spectral region into a number of spectral bins (column 4, lines 59-68)that determine a spectral resolution (column 3, lines 1-11, "spectral regions"), each bin (column 4, lines 59-68)having a width of less than 1.0 cm^{-1} (mention of Optical beams, column 4, line 17) depth less than 1.0 cm^{-1}, column 4, lines31-33); calculating line tail absorption (column 13, line 3) within each bin from atomic and molecular transitions (suggestion of molecular activity, "molecular profiles", column 4, line 10)centered outside of the bin (column 4, lines 59-68) using Pade (well known mathematical functions) approximant spectral fits to Voigt (column 14, lines 63-66) absorption coefficient curves; determining atomic and molecular species spectral transmittances (abstract, lines 2 and 4) for each spectral bin, (column 4, lines 59-68) the spectral transmittance (abstract, lines 2 and 4)having a value which is a function of at least the calculated line tail (column 14, lines 5-17, especially line

18)absorptions (column 13, line 3):and using the determined spectral transmittances (abstract, lines 2 and 4)in analysis of atmospheric optical (mention of Optical beams, column 4, line 17) sensor (block diagram of sensor system, column 3, line 3) data.

Claim 24. The method of claim 23, wherein the calculating step includes determining a database of temperature (column 12, line 5) and pressure dependent Pade (well known mathematical functions) approximant spectral fits to Voigt (column 14, lines 63-66) absorption coefficient curves.

Claim 25. The method of claim 24, wherein there are five Pade (well known mathematical functions) parameters.

Claim 26. The method of claim 24, wherein Pade (well known mathematical functions) parameters are determined from summed line tail (column 14, lines 5-17, especially line 18)spectral absorption coefficients (column 12, line 52).

Claim 27. The method of claim 26, wherein each bin (column 4, lines 59-68) has a center and two edges, and one Pade (well known mathematical functions) parameter is determined at the center of the bin(column 4, lines 59-68), and one at each edge of the bin (column 4, lines 59-68).

Claim 28. The method of claim 24, wherein one Pade (well known mathematical functions) parameter is the derivative of the absorption coefficient with respect to a normalized spectral variable at the line center.

Claim 29. The method of claim 24, wherein one Pade (well known mathematical functions) parameter is the integral of the spectral absorption coefficient (column 12, line 52) over a spectral band (e.g. spectrum chart, figure 2).

Claim 30. The method of claim 24, wherein the Pade (well known mathematical functions) database is generated for a plurality of temperatures (column 12, line 5) (column 2, line 10).

Claim 31. The method of claim 24, wherein the Pade (well known mathematical functions) database is determined for a plurality of pressures (suggestion or mention of pressure in relation to the line center using the Lorentz equation, column 13, lines 49-55).

Claim 33. The method of claim 23, wherein the spectral bins (column 4, lines 59-68) have a width of about 0.1 cm^{-1}.

Section III: Response to Arguments

112/ Double Patenting

7. Applicants are thanked for addressing this issue. Rejection is withdrawn from the previous office action.

101

8. Applicants are thanked for addressing this issue; however, the applicants' response is non-persuasive.

MPEP 2102.02 states:

"[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is **based on the product itself**. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process."
It's not the process that is patentable but the product itself. Thus the claims resemble data manipulation of atmospheric transmittances, thus representing an abstract idea.

Using a transfer algorithm, MODRAN4, to gather and manipulate abstract specific data, in this case is nothing more than data manipulation of spectral transmittances for atmospheric optical sensors.

MPEP 2106.02 Section IV states:

The subject matter courts have found to be outside >of, or exceptions to,< the four statutory categories of invention is limited to abstract ideas, laws of nature and natural

phenomena. While this is easily stated, determining whether an applicant is seeking to patent an abstract idea, a law of nature or a natural phenomenon has proven to be challenging. **These three exclusions recognize that subject matter that is not a practical application or use of an idea, a law of nature or a natural phenomenon is not patentable.**

See, *e.g., Rubber-Tip Pencil Co. v. Howard, 87 U.S. (20 Wall.) 498, 507 (1874)* ("idea of itself is not patentable, but a new device by which it may be made practically useful is"); *Mackay Radio & Telegraph Co. v. Radio Corp. of America, 306 U.S. 86, 94, 40 USPQ 199, 202 (1939)* ("While a scientific truth, or the mathematical expression of it, is not patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be."); *Warmerdam, 33 F.3d at 1360, 31 USPQ2d at 1759* **("steps of locating' a medial axis, and creating' a bubble hierarchy . . . describe nothing more than the manipulation of basic mathematical constructs, the paradigmatic abstract idea"**).

Rejection as set forth above stands.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicants' disclosure:

Wan et al., "Effects to Temperature-Dependent Molecular Absorption of the Thermal Infrared Remote Sensing of the Earth Surface", IGARSS 1992 pg.1242-1245: teaches the effect of temperature-dependent molecular absorption coefficients on thermal infrared spectral signatures.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mr. Tom Stevens whose telephone number is 571-272-3715.

If attempts to reach the examiner by telephone are unsuccessful, please contact examiner's supervisor Mr. David Vincent 571-272-3080. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov.. Answers to questions regarding access to the Private PAIR system, contact the Electronic Business Center (EBC) (toll-free (866-217-9197)).

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